GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: November 11, 2011

TO: Chris Lanane, Scott Weaver

FROM: Mike Horn

SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lone Pine, November 11, 2011," for your review. Please refer any comments you may have on the document to me by January 11, 2012. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District
Quality Assurance
Audit Report

SITE:
LONE PINE

Report Date: November 11, 2011
Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lone Pine was audited on November 9, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10 FDMS

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM) FDMS
AUDIT

Date of report:	11/11/11		
Date:	11/9/11	Site name:	Lone Pine - FDMS
Start:	15:00hrs. PST	Operator:	Scott Weaver
Finish:	15:20hrs. PST	Project:	SB 270
Audited By:	Mike Horn	Site Elevation:	3703 ft.
Witness:	Scott Weaver	Amb. Pres.:	900.20 hPa
		Amb. Temp.:	15.3 deg. C
Prop. or Serial No.:	24928	Make:	R & P
Type:	PM-10 FDMS	Model:	1400ab
		Last cal. date:	9/27/11

AUDIT DEVICE(S)

Make:	BGI Incorporated	Make:	BGI Incorporated
Model:	DELTA CAL	Model:	DELTA CAL
S/N:	525	S/N:	123
Range:	2 - 20 lpm	Range:	2 - 20 lpm
	Calibration Factors		Calibration Factors
Slope:	1.00	Slope:	1.00
Intercept:	0.00	Intercept:	0.00
Cal Date:	12/22/10 Date of first use 1/12/11	Cal Date:	12/22/10

	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.150	0.530	14.6	-0.7	893.47	-6.7
Pump off leak check:	N/A	N/A				

$Qa=[dPxTa/Pa]^{1/2}+b$

Audit Point	Audit Flow Rate, ΔP, in. H2O	Audit Flow Rate, (VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates Lower Limit (LPM)	Nominal Flow Rates Upper Limit (LPM)
Total Flow Rate	16.52	16.52	16.66	0.8	15.0	18.4
Bypass/Aux Flow Rate	13.51	13.51	13.66	1.1		
Main Flow Rate	2.99	2.99	3.00	0.3	2.7	3.3
Total Flow Rate	16.49	16.49	16.66	1.0	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measurement Variable		Evaluation Criteria
Wind Speed		At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input ± 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction		input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature		input ± 0.5° C Gravimetry Lab ± 1.0 deg. C input ± 2.0° C for PM-10, PM-2.5 samplers
Relative Humidity		Ambient: input ± 5% RH, ± 1.5°C as dew point Gravimetry Lab: input ± 5%
Precipitation		input ± 10%
Barometric Pressure		Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5		input ± 10%; Design Flow ± 10% input ± 4%; Design Flow ± 5%
TEOM:	Total Flow	input ± 10%; Design Flow ± 10%
	Main Flow	input ± 10%; Design Flow ± 10%
	Bypass Flow	input ± 10%; Design Flow ± 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CU10, HS10	8/30/11	N/A	N/A
Psychro-Dyne Psychrometer:	RH 04	N/A	1 0	1 0
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

Great Basin Unified Air Pollution Control District

Tapered Element Oscillating Microbalance (TEOM)

FLOW AUDIT FDMS

Date:	11/9/11		Site Name:	Lone Pine	
Start:	15:00	PST	Operator:	Scott Weaver	
Finish:	15:20	PST	Project:	SB270	
			Site Elevation:		ft
			Amb. Press.:	900.7	in. Hg
			Amb. Temp.:	15.3	deg. C
Prop. Or Ser. No.:	24925		Make:	R&P	
Type:	PM10		Model:	1400a	
			Last Cal. Date:	9/27/11	

Audit Device(s)

Make:	BGI INCORPORATED		Make:	BGI INCORPORATED	
Model:	DELTA CAL		Model:	DELTA CAL	
S/N:	0123 ~~525~~		S/N:	0123	
Range:	2 - 20	lpm	Range:	2 - 20	lpm
Calibration factors:			Calibration factors:		
Slope:	1.0		Slope:	1.0	
Int.:	0.0		Int.:	0.0	
Cal Date:	[illegible]		Cal Date:	[illegible]	

$Q_a = m[dP \times T_a / P_a]^{1/2} + b$ Altitude Correction Factor: ÷ 1013

Leak Check-Initial	Main:	.15	Aux:	.53
Leak Check-Final	Main:		Aux:	

Audit Point	Audit Flow Rate delta P	(VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates Lower Limit (LPM)	Upper Limit (LPM)
Total Fow Rate	16.52		3.00/13.66=16.66		15.0	18.4
Aux. Flow Rate	13.51		13.66			
Main Flow Rate	2.99		3.00		2.7	3.3
Total Flow Rate	16.49		16.66		15.0	18.4

	Sampler	Standard True	Standard Raw
Amb Temp	14.6		15.3
Amb Press	.882	893.47	900.2

Comments:

Calibrated By: Mike Nelson

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: July 7, 2011

TO: Chris Lanane, Scott Weaver

FROM: Mike Horn

SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lone Pine, July 7, 2011," for your review. Please refer any comments you may have on the document to me by September 7, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District
Quality Assurance
Audit Report

SITE:
LONE PINE

Report Date: July 7, 2011
Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lone Pine was audited on July 6, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10 FDMS

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM) FDMS
AUDIT

Date of report:	7/7/11		
Date:	7/6/11	Site name:	Lone Pine - FDMS
Start:	14:15hrs. PST	Operator:	Scott Weaver
Finish:	14:35hrs. PST	Project:	SB 270
Audited By:	Mike Horn	Site Elevation:	3703 ft.
Witness:	Scott Weaver	Amb. Pres.:	888.40 hPa
		Amb. Temp.:	29.2 deg. C
Prop. or Serial No.:	24928	Make:	R & P
Type:	PM-10 FDMS	Model:	1400ab
		Last cal. date:	6/7/11

AUDIT DEVICE(S)

Make:	BGI Incorporated	Make:	BGI Incorporated
Model:	DELTA CAL	Model:	DELTA CAL
S/N:	525	S/N:	123
Range:	2 - 20 lpm	Range:	2 - 20 lpm
	Calibration Factors		Calibration Factors
Slope:	1.00	Slope:	1.00
Intercept:	0.00	Intercept:	0.00
Cal Date:	12/22/10 Date of first use 1/12/11	Cal Date:	12/22/10

	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.060	0.390	29.0	-0.2	885.36	-3.0
Pump off leak check:	N/A	N/A				

$Qa=[dPxTa/Pa]^{1/2}+b$

Audit Point	Audit Flow Rate, ΔP, in. H2O	Audit Flow Rate, (VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates Lower Limit (LPM)	Nominal Flow Rates Upper Limit (LPM)
Total Flow Rate	16.61	16.61	16.65	0.2	15.0	18.4
Bypass/Aux Flow Rate	13.51	13.51	13.65	1.0		
Main Flow Rate	3.04	3.04	3.00	-1.3	2.7	3.3
Total Flow Rate	16.63	16.63	16.65	0.1	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measurement Variable		Evaluation Criteria
Wind Speed		At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input ± 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction		input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature		input ± 0.5° C input ± 2.0° C for PM-10, PM-2.5 samplers
Relative Humidity		Ambient: input ± 5% RH, ± 1.5°C as dew point Gravimetry Lab: input ± 5%
Precipitation		input ± 10%
Barometric Pressure		Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5		input ± 10%; Design Flow ± 10% input ± 4%; Design Flow ± 5%
TEOM:	Total Flow	input ± 10%; Design Flow ± 10%
	Main Flow	input ± 10%; Design Flow ± 10%
	Bypass Flow	input ± 10%; Design Flow ± 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)
FLOW AUDIT FDMS

Date:	7/6/11		Site Name:	Long Pine	
Start:	14:15	PST	Operator:	Scott Weaver	
Finish:	14:35	PST	Project:	SB270	
			Site Elevation:		ft
			Amb. Press.:	888.4	in. Hg
			Amb. Temp.:	29.2	deg. C
Prop. Or Ser. No.:	24925		Make:	R&P	
Type:	PM10		Model:	1400a	
			Last Cal. Date:	6/7/11	

Audit Device(s)			
Make:	BGI INCORPORATED	Make:	BGI INCORPORATED
Model:	DELTA CAL	Model:	DELTA CAL
S/N:	~~0123~~ 525	S/N:	0123
Range:	2 - 20 lpm	Range:	2 - 20 lpm
Calibration factors:		Calibration factors:	
Slope:	1.0	Slope:	1.0
Int.:	0.0	Int.:	0.0
Cal Date:	1/4/11	Cal Date:	

$Q_a = m[dP \times T_a / P_a]^{1/2} + b$ Altitude Correction Factor: ÷ 1013

Leak Check-Initial	Main:	.06	Aux:	.39
Leak Check-Final	Main:		Aux:	

Audit Point	Audit Flow Rate delta P	(VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates Lower Limit (LPM)	Upper Limit (LPM)
Total Fow Rate	16.61		3.80/13.65 = 16.45		15.0	18.4
Aux. Flow Rate	13.51		13.65			
Main Flow Rate	3.04		3.80		2.7	3.3
Total Flow Rate	16.63		16.65		15.0	18.4

	Sampler	Standard True	Standard Raw
Amb Temp	29.0		29.2
Amb Press	.874	885.36	888.4

Comments:

Calibrated By: Mk

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: April 11, 2011

TO: Chris Lanane, Scott Weaver

FROM: Mike Horn

SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lone Pine, April 11, 2011," for your review. Please refer any comments you may have on the document to me by June 13, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District
Quality Assurance
Audit Report

SITE:
LONE PINE

Report Date: April 11, 2011
Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lone Pine was audited on April 4, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10 FDMS

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM) FDMS
AUDIT

Date of report:	4/11/11		
Date:	4/4/11	Site name:	Lone Pine - FDMS
Start:	14:40hrs. PST	Operator:	Scott Weaver
Finish:	15:00hrs. PST	Project:	SB 270
Audited By:	Mike Horn	Site Elevation:	3703 ft.
Witness:	Scott Weaver	Amb. Pres.:	892.20 hPa
		Amb. Temp.:	24.3 deg. C
Prop. or Serial No.:	24928	Make:	R & P
Type:	PM-10 FDMS	Model:	1400ab
		Last cal. date:	3/22/11

AUDIT DEVICE(S)

Make:	BGI Incorporated	Make:	BGI Incorporated
Model:	DELTA CAL	Model:	DELTA CAL
S/N:	525	S/N:	123
Range:	2 - 20 lpm	Range:	2 - 20 lpm
	Calibration Factors		Calibration Factors
Slope:	1.00	Slope:	1.00
Intercept:	0.00	Intercept:	0.00
Cal Date:	12/22/10 Date of first use 1/12/11	Cal Date:	12/22/10

	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.060	0.350	23.1	-1.2	888.40	-3.8
Pump off leak check:	N/A	N/A				

$Qa=[dPxTa/Pa]^{1/2}+b$

Audit Point	Audit Flow Rate, ΔP, in. H2O	Audit Flow Rate, (VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates Lower Limit (LPM)	Nominal Flow Rates Upper Limit (LPM)
Total Flow Rate	16.59	16.59	16.66	0.4	15.0	18.4
Bypass/Aux Flow Rate	13.46	13.46	13.66	1.5		
Main Flow Rate	2.97	2.97	3.00	1.0	2.7	3.3
Total Flow Rate	16.54	16.54	16.66	0.7	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measurement Variable		Evaluation Criteria
Wind Speed		At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input ± 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction		input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature		input ± 0.5° C input ± 2.0° C for PM-10, PM-2.5 samplers
Relative Humidity		Ambient: input ± 5% RH, ± 1.5°C as dew point Gravimetry Lab: input ± 5%
Precipitation		input ± 10%
Barometric Pressure		Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5		input ± 10%; Design Flow ± 10% input ± 4%; Design Flow ± 5%
TEOM:	Total Flow Main Flow Bypass Flow	input ± 10%; Design Flow ± 10% input ± 10%; Design Flow ± 10% input ± 10%; Design Flow ± 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

Great Basin Unified Air Pollution Control District

Tapered Element Oscillating Microbalance (TEOM)

FLOW AUDIT FDMS

Date:	4/4/11		Site Name:	Jerry Ripper	
Start:	14:40	PST	Operator:	Scott Mears	
Finish:	15:00	PST	Project:	SB270	
			Site Elevation:		ft
			Amb. Press.:	892.2	in. Hg
			Amb. Temp.:	24.3	deg. C
Prop. Or Ser. No.:	24925		Make:	R&P	
Type:	PM10		Model:	1400a	
			Last Cal. Date:	3/22/11	

Audit Device(s)

Make:	BGI INCORPORATED		Make:	BGI INCORPORATED	
Model:	DELTA CAL		Model:	DELTA CAL	
S/N:	~~0123~~ 525		S/N:	0123	
Range:	2 - 20	lpm	Range:	2 - 20	lpm
Calibration factors:			Calibration factors:		
Slope:	1.0		Slope:	1.0	
Int.:	0.0		Int.:	0.0	
Cal Date:	1/4/11		Cal Date:		

$Q_s = m[dP \times T_s / P_s]^{1/2} + b$ Altitude Correction Factor: ÷ 1013

Leak Check-Initial	Main:	.82	Aux:	.35
Leak Check-Final	Main:		Aux:	

Audit Point	Audit Flow Rate delta P	(VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates Lower Limit (LPM)	Upper Limit (LPM)
Total Fow Rate	16.59		3.00/13.66 = 16.66		15.0	18.4
Aux. Flow Rate	13.46		13.66			
Main Flow Rate	2.99		3.00		2.7	3.3
Total Flow Rate	16.54		16.66		15.0	18.4

	Sampler	Standard True	Standard Raw
Amb Temp	23.1		24.3
Amb Press	.877	888.40	892.2

Comments:

Calibrated By: Mike Fe

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: October 14, 2011

TO: Chris Lanane, Scott Weaver

FROM: Mike Horn

SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lone Pine, January 14, 2011," for your review. Please refer any comments you may have on the document to me by March 14, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District
Quality Assurance
Audit Report

SITE:
LONE PINE

Report Date: January 14, 2011
Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lone Pine was audited on January 12, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10 FDMS

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM) FDMS
AUDIT

Date of report:	1/14/11		
Date:	1/12/11	Site name:	Lone Pine - FDMS
Start:	14:00hrs. PST	Operator:	Scott Weaver
Finish:	14:20hrs. PST	Project:	SB 270
Audited By:	Mike Horn	Site Elevation:	3703 ft.
Witness:	Scott Weaver	Amb. Pres.:	897.80 hPa
		Amb. Temp.:	12.1 deg. C
Prop. or Serial No.:	24928	Make:	R & P
Type:	PM-10 FDMS	Model:	1400ab
		Last cal. date:	12/7/10

AUDIT DEVICE(S)

Make:	BGI Incorporated	Make:	BGI Incorporated
Model:	DELTA CAL	Model:	DELTA CAL
S/N:	525	S/N:	123
Range:	2 - 20 lpm	Range:	2 - 20 lpm
	Calibration Factors		Calibration Factors
Slope:	1.00	Slope:	1.00
Intercept:	0.00	Intercept:	0.00
Cal Date:	12/22/10 Date of first use 1/12/11	Cal Date:	12/22/10

	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.050	0.320	12.1	0.0	894.48	-3.3
Pump off leak check:	N/A	N/A				

$Qa=[dPxTa/Pa]^{1/2}+b$

Audit Point	Audit Flow Rate, ΔP, in. H2O	Audit Flow Rate, (VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates Lower Limit (LPM)	Nominal Flow Rates Upper Limit (LPM)
Total Flow Rate	16.36	16.36	16.66	1.8	15.0	18.4
Bypass/Aux Flow Rate	13.39	13.39	13.66	2.0		
Main Flow Rate	2.96	2.96	3.00	1.4	2.7	3.3
Total Flow Rate	16.31	16.31	16.66	2.1	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measurement Variable		Evaluation Criteria
Wind Speed		At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input ± 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction		input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature		input ± 0.5° C input ± 2.0° C for PM-10, PM-2.5 samplers
Relative Humidity		Ambient: input ± 5% RH, ± 1.5°C as dew point Gravimetry Lab: input ± 5%
Precipitation		input ± 10%
Barometric Pressure		Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5		input ± 10%; Design Flow ± 10% input ± 4%; Design Flow ± 5%
TEOM:	Total Flow	input ± 10%; Design Flow ± 10%
	Main Flow	input ± 10%; Design Flow ± 10%
	Bypass Flow	input ± 10%; Design Flow ± 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE		Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	Date of first use 1/12/11	123	12/22/09	1.0	0.0
BGI Delta CAL:		525	1/4/11	1.0	0.0
Testo 735-1		01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:		P9	12/17/10	1.0	0.0
RM Young wind speed motor:		CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:		RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:		52202	N/A		

Great Basin Unified Air Pollution Control District

Tapered Element Oscillating Microbalance (TEOM)

FLOW AUDIT FDMS

Date:	1/12/11		Site Name:	Lone Pine	
Start:	14:00	PST	Operator:	Scott Weaver	
Finish:	14:20	PST	Project:	SB270	
			Site Elevation:		ft
			Amb. Press.:	897.8	in. Hg
			Amb. Temp.:	12.1	deg. C
Prop. Or Ser. No.:	24928		Make:	R&P	
Type:	PM10		Model:	1400a	
			Last Cal. Date:	12/7/10	

Audit Device(s)

Make:	BGI INCORPORATED		Make:	BGI INCORPORATED	
Model:	DELTA CAL		Model:	DELTA CAL	
S/N:	0123 ~~525~~		S/N:	0123	
Range:	2 - 20	lpm	Range:	2 - 20	lpm
Calibration factors:			Calibration factors:		
Slope:	1.0		Slope:	1.0	
Int.:	0.0		Int.:	0.0	
Cal Date:	[illegible]		Cal Date:	[illegible]	

$Q_a = m[dP \times T_a / P_a]^{1/2} + b$ Altitude Correction Factor: ÷ 1013

Leak Check-Initial	Main:	.05	Aux:	.32
Leak Check-Final	Main:		Aux:	

Audit Point	Audit Flow Rate delta P	(VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates Lower Limit (LPM)	Upper Limit (LPM)
Total Fow Rate	16.36		3.00/13.66 = 16.66		15.0	18.4
Aux. Flow Rate	13.39		13.66			
Main Flow Rate	2.96		3.00		2.7	3.3
Total Flow Rate	16.31		16.66		15.0	18.4

	Sampler	Standard True	Standard Raw
Amb Temp	12.1		12.1
Amb Press	.8863	894.48	897.8

Comments:

Calibrated By: [signature]